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Bruun, Jesper; Jensen, Pia; Udby, Linda

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DEPARTMENT OF SCIENCE EDUATION
NIELS BOHR INSTITUTE
UNIVERSITY OF COPENHAGEN

Mapping student online actions

J Bruun[1], P Jensen[2], and L Udby[2]

[1]Department of Science Education, University of Copenhagen, Denmark, [2]Niels Bohr Institute, University of Copenhagen, Denmark

1.Keeping track of student learning

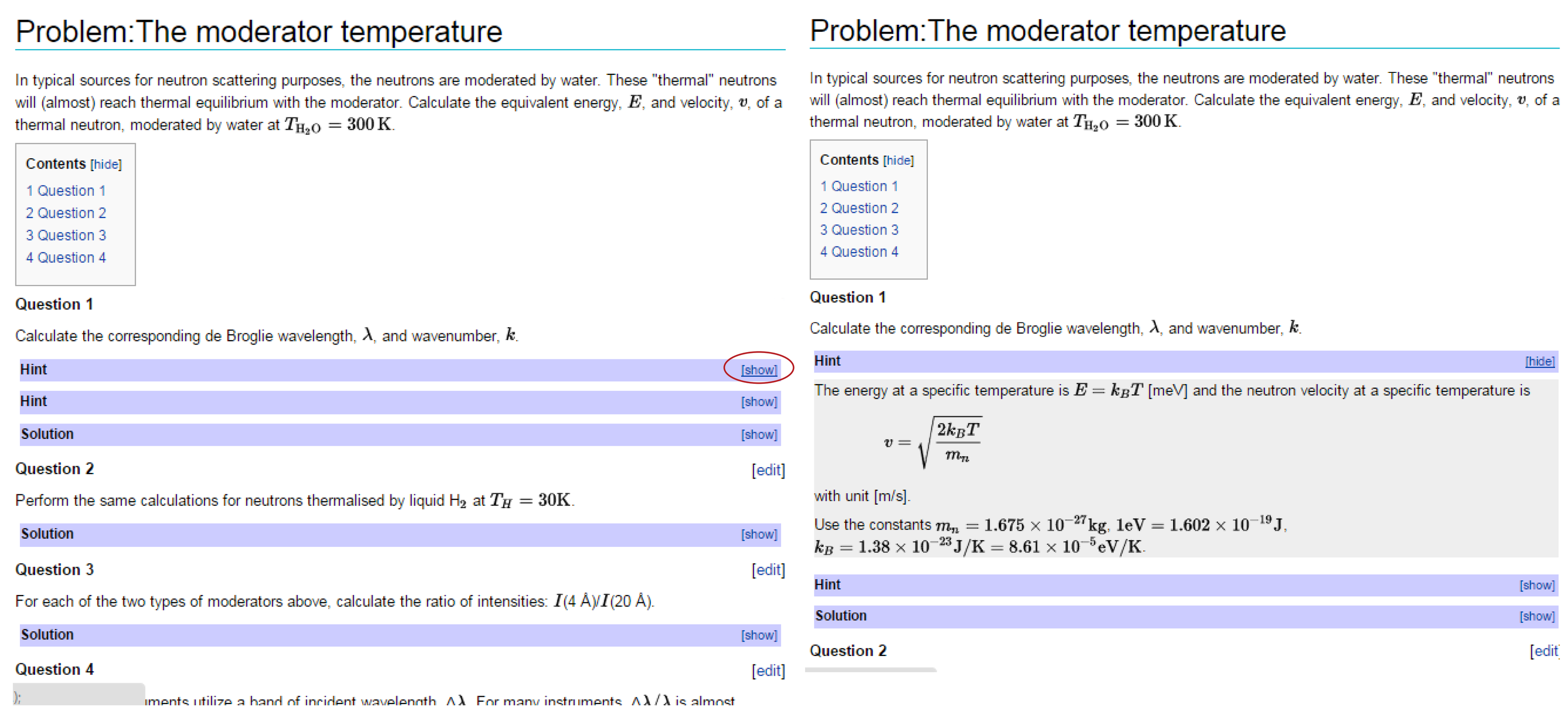
In this study, we investigate how students in a physics course on neutron scattering use a web-based wiki-formatted textbook while they are in class [2].

Inspired by [1], we use server log-files to track and construct networks of user sessions on a web-site for learning.

Network analysis have previously been employed to online forum discussions [3,4]. We focus on *behaviours while solving problems* that are related to learning.

We have constructed socalled wiki-problems. In solving these problems, we aim for students to make use of hints, solutions and other parts of the web-site.

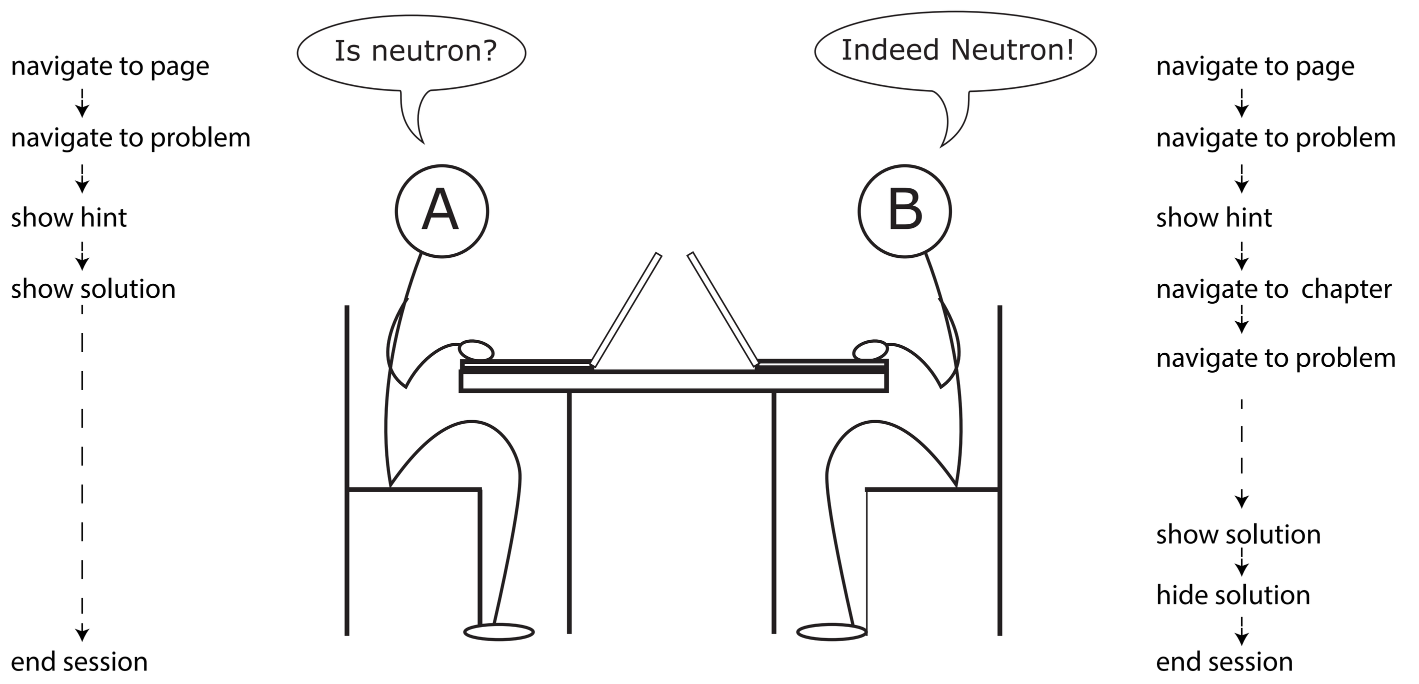
We ask the question: “What patterns of engagement can we discern from network representations of student interactions?”



As part of class, students work with online problems that contain hints and solutions that students can open and close as they wish.

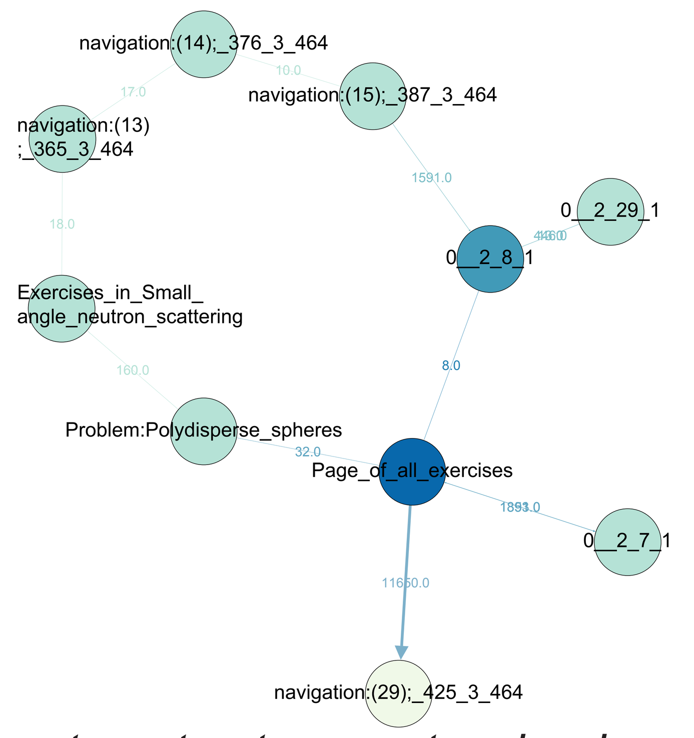
2. Student online actions while learning as networks

The learning situation

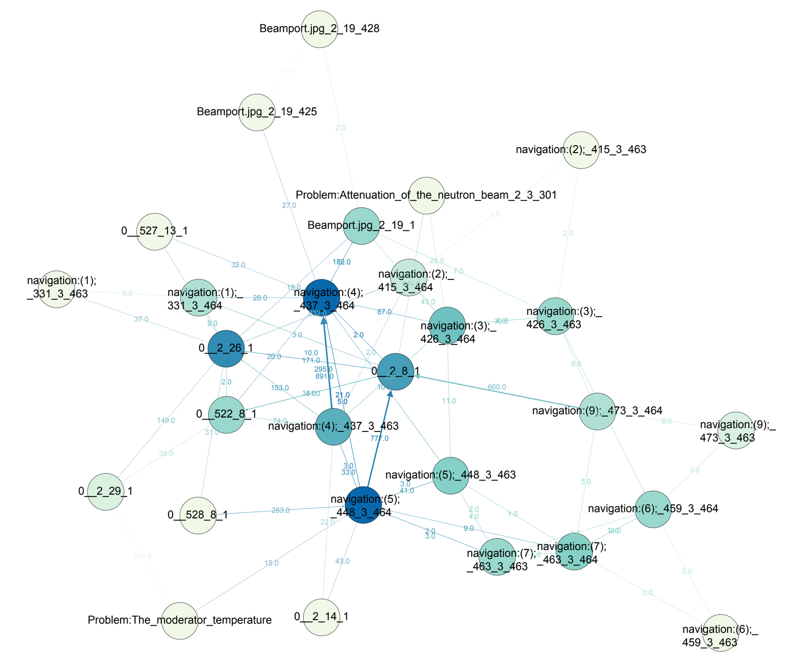


Even when communicating, students may have different strategies

Resulting output and networks



A low target entropy network - duration between clicks written on links.



A low target entropy network - link color represents degree.

As part of the course, students spend time in class solving online problems with hints. Student online actions during these sessions are recorded with web-analytics software OWA (http://www.openwebanalytics.com/).

Specifically, we record ip-adresses, where, when, and on what they click on the web-site pages, and the unique id for each session.

We have collected data from three different iterations of the course (2012, 2013, and 2014) with approximately 15 students each year.

We use networks and network measures to characterize student sessions as these are logged by the server. For example, target entropy [5] is a measure of how predictable student interactions are.

Using educational research to help us interpret the results [3,4], we argue that a high a entropy network likely signifies more student active engagement (rather than passively reading the a page).

We want to investigate different online strategies and link these to student learning outcomes. We are in the process of identifying strategies.

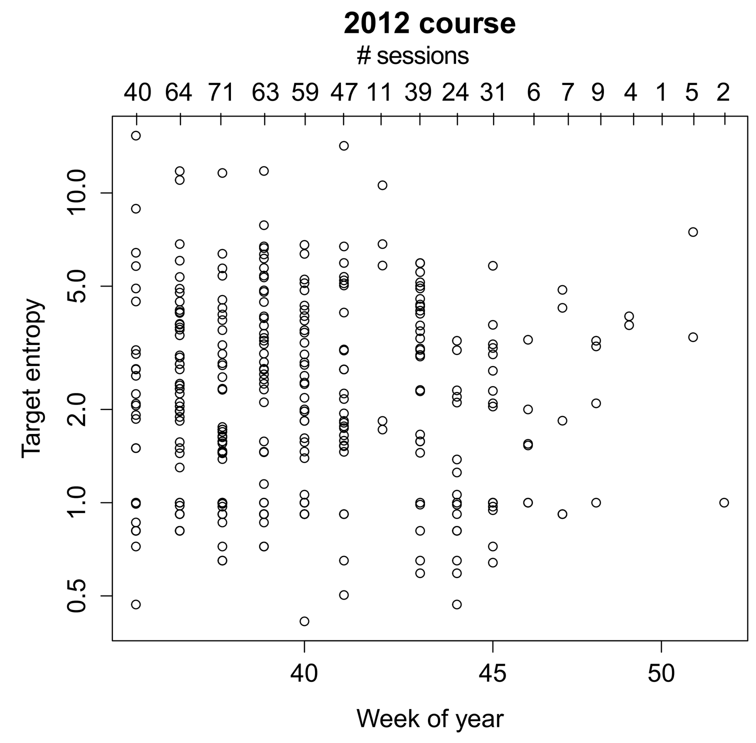
3. Comparison between students from different years

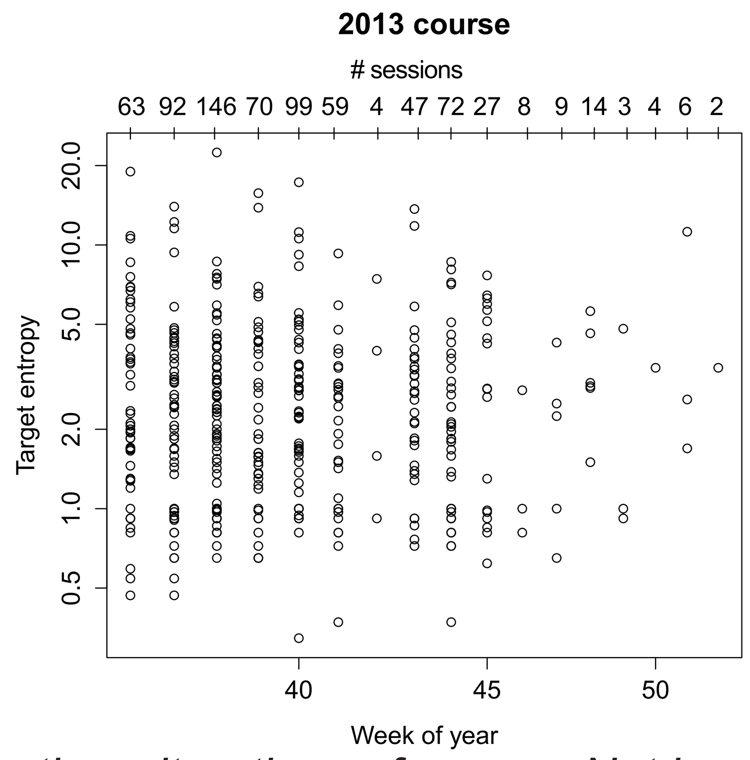
We compare sessions recorded during the weeks in which students engage with online material.

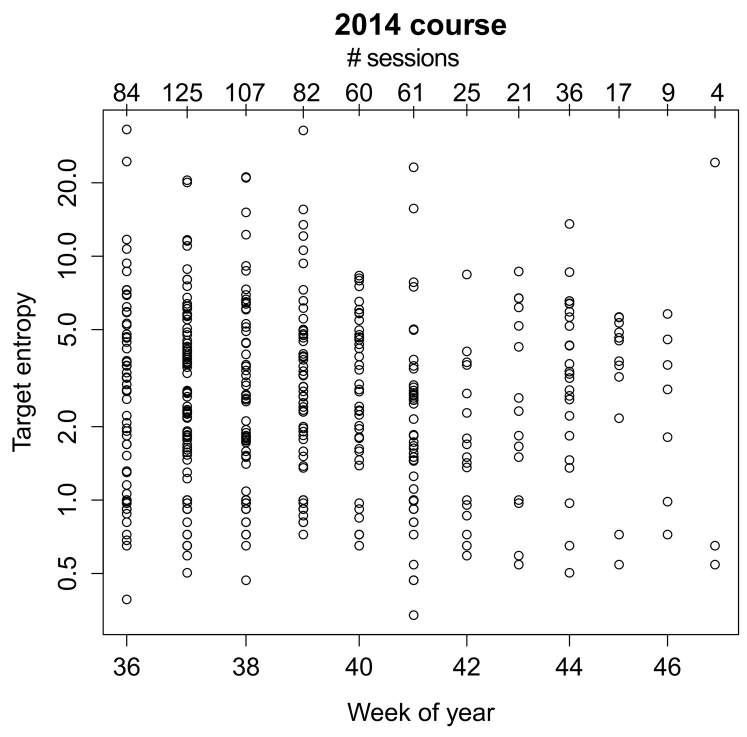
We only consider sessions with duration d>5 min.

Using non-parametric tests, we find the target entropy for 2014 is significantly higher than for 2012 and for 2013 (p<0.01).

The plots show that students focus their engagement early in the course. This is also when they are given time during class to solve these problems.







Sessions and target entropy per week for three iterations of course. Not log-scale on y-axis. Sessions with 0 target entropy, 174, 300, and 189 sessions for 2012-2014 respectively are not in the plot.

Selected References

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Ask a question!

Jesper Bruun
PhD, Post Doc
jbruun@ind.ku.dk
Department of Science Education
Faculty of Science

Seems like we ran out of questions. But fear not! You can contact Jesper with questions and comments. As we are in the early stages of interpretation, we especially welcome new ideas!